

9 channel, the MAP messages including idle slots that are assigned to
10 no cable modems;
11 a transmitter that transmits the MAP messages with the
12 idle slots downstream to the cable modems; and
13 a device connected to the demodulator for sensing cable
14 conditions on the upstream channel during the idle slots.

1 3. The CMTS of claim 2, in which the device is a notch
2 filter having coefficients that compensate for noise on the
3 upstream channel.

1 4. The CMTS of claim 3, additionally comprising a decision
2 feedback equalizer connected to the demodulator and the notch
3 filter, the decision feedback equalizer having a feedback filter
4 with the same coefficients as the notch filter to compensate for its
5 distortion.

A) 5
cont

1 5. The CMTS of claim 4, in which the decision feedback
2 equalizer has a feedforward filter for establishing pre-
3 equalization coefficients.

1 6. The CMTS of claim 5, in which the demodulator converts
2 the signal bursts to binary data, the system additionally
3 comprising a signal path for carrying the binary data from the
4 demodulator to the MAC, the notch filter and the decision feedback
5 equalizer being in the signal path.

1 7. The CMTS of claim 6, in which the signal path carries
2 both the binary data and pre-equalization coefficients to the MAC
3 in band such that the coefficients are appended to the binary data.

1 8. The CMTS of claim 7, in which the pre-equalization
2 coefficients do not reflect noise received by the demodulator, the
3 system additionally comprising an upstream transmitter for
4 transmitting the pre-equalization coefficients established by the
5 feedforward filter.

1 9. The CMTS of claim 8, in which the upstream transmitter is
2 connected to the MAC to transmit the pre-equalization coefficients
3 established by the feed forward filter.

A)
cont 1 10. A cable modem termination system (CMTS) that can receive
2 a signal transmitted in a cable modem system on an upstream
3 channel, the CMTS comprising:

4 a demodulator;

5 a notch filter connected to the demodulator, the notch
6 filter having coefficients that are adjustable to cancel noise
7 applied to the demodulator.

8 a media access controller (MAC) that processes binary
9 data and generates for downstream transmission MAP messages that
10 assign time slots in which cable modems may transmit signal bursts
11 on the upstream channel; and

12 a decision feedback equalizer coupled to the demodulator,
13 the decision feedback equalizer including a feedforward filter for
14 establishing pre-equalization coefficients.

1 11. The CMTS of claim 10, in which both binary data and pre-
2 equalization coefficients are provided to the MAC in band such that
3 the coefficients are appended to the binary data.

1 12. The CMTS of claim 11, in which the pre-equalization
2 coefficients do not reflect noise applied to the demodulator, the
3 system additionally comprising an upstream transmitter connected to

4 the MAC to transmit the pre-equalization coefficients established
5 by the feedforward filter.

1 13. A method for compensating for conditions on an upstream
2 channel from a plurality of cable modems to a cable modem
3 termination system (CMTS), the method comprising the steps of:
4 transmitting on a downstream channel from the CMTS to a
5 plurality of cable modems MAP messages that assign time slots in
6 which cable modems may transmit signal bursts on the upstream
7 channel, the MAP messages including idle slots that are assigned to
8 no cable modems;
9 monitoring conditions on the upstream channel during the
10 idle slots; and
11 compensating for the monitored conditions on the upstream
12 channel; and
13 receiving at the CMTS signal bursts on the upstream
14 channel after such compensation.

A1
cont

1 14. The method of claim 13, in which the monitoring step
2 comprises sensing the noise on the upstream channel during the
3 idle slots.

1 15. The method of claim 14, in which the compensating step
2 comprises adjusting the coefficients of a notch filter
3 to compensate for the sensed noise on the upstream channel during
4 the idle slots.

1 16. The method of claim 15, in which the compensating step
2 further comprises adjusting a feedback filter of a decision
3 feedback filter in series with the notch filter to have the same
4 coefficients as the notch filter to compensate for its distortion.

1 17. The method of claim 16, additionally comprising the steps
2 of:

3 receiving on the upstream channel a ranging signal from
4 a cable modem;

5 adjusting coefficients of a feedforward filter of the
6 decision feedback filter responsive to the received ranging signal
7 to compensate for intersymbol interference on the upstream channel;
8 and

9 transmitting the adjusted coefficients on a downstream
10 channel to the cable modem for the purpose of pre-equalization.

1 18. The method of claim 17, in which the transmitting
2 steps transmit the MAP messages and the adjusted coefficients on
3 the same channel.

AI
cont
1 19. A method for compensating for conditions on an upstream
2 channel from a plurality of cable modems to a cable modem
3 termination system (CMTS), the method comprising the steps of:

4 compensating for noise on an upstream channel;

5 receiving on the compensated upstream channel a ranging
6 signal from one of the cable modems;

7 adjusting filter coefficients to compensate for
8 intersymbol interference on the upstream channel responsive to the
9 received ranging signal; and

10 transmitting the adjusted coefficients on a downstream
11 channel to the cable modem for the purpose of pre-equalization of
12 the upstream channel.

1 20. The method of claim 19, in which the adjusting step
2 comprises adjusting coefficients of a feedforward filter of a
3 decision feedback filter.

1 21. The method of claim 20, in which the compensating step
2 comprises adjusting the coefficients of a notch filter in series
3 with the decision feedback filter.

1 22. The method of claim 21, in which the compensating step
2 further comprises adjusting a feedback filter of the decision
3 feedback filter to have the same coefficients as the notch filter to
4 compensate for its distortion.

1 23. The method of claim 22, additionally comprising the step
2 of transmitting on a downstream channel from the CMTS to the cable
3 modems MAP messages that assign time slots in which cable modems
4 may transmit signal bursts on the upstream channel.

AI
cont
1 24. The method of claim 23, in which the transmitting
2 steps transmit the MAP messages and the adjusted coefficients on
3 the same channel.

1 25. A cable modem comprising:
2 a transmitter for sending ranging signals to a cable
3 modem termination system (CMTS) to enable the CMTS to generate
4 equalization coefficients and return such equalization
5 coefficients;

6 a receiver for processing equalization coefficients
7 returned by the CMTS, the returned equalization coefficients not
8 reflecting noise received by the CMTS;

9 a source of data to be sent to the CMTS;

10 an equalizer connecting the source to the transmitter to
11 send the data to the CMTS, the returned coefficients being


Application No. 09/430,821

12 impressed on the equalizer to pre-equalize the data sent to the
A13 CMTS without reflecting noise received by the CMTS.--
cond

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By



LeRoy T. Rahn
Reg. No. 20,356
626/795-9900

LTR/bje

MEE PAS274399.1--10/2/00 7:25 PM